

Light-weight scaffold board and method for producing the same

Claims

01. A light scaffolding plate to be laid, inserted, fitted, riveted, screw, glued, welded, or attached in another way in a metal, preferably aluminum frame of a façade or rolling scaffold provided for this purpose or to be suspended directly in a scaffold, in various lengths and widths, and methods for its manufacture, characterized in that it is molded, fitting with one or more of the known scaffold systems, as a sandwich panel from a thermoplastic or duroplastic or a mixture of the two and is provided with a reinforcement.
02. The light scaffolding plate according to Claim 01, characterized in that the upper and/or lower cover layer of the plate is made of reinforced or unreinforced plastic material.
03. The light scaffolding plate according to Claims 01 and 02, characterized in that the border or edge terminuses and/or the intermediate webs and/or the frame reinforcements are made of reinforced plastic material, the lower and/or upper cover layer material, and/or the compressed or melted and solidified support core material.
04. The light scaffolding plate according to Claims 01 through 03, characterized in that the reinforcement is made of long-fiber and/or short-fiber natural, metal, or artificial fibers, fabrics or nonwoven materials made thereof, which are made of glass, plastic, carbon, or metal or a mixture thereof.
05. The light scaffolding plate according to Claims 01 through 04, characterized in that the upper and/or lower cover layer of the plate is a perforated metal plate or film or such a plate or film is embedded in the cover layer.

06. The light scaffolding plate according to Claims 01 through 06, characterized in that the upper and/or cover layer of the plate is a sinkhole perforated sheet or film.
07. The light scaffolding plate according to Claims 01 through 07, characterized in that the perforated metal plate or film or the sinkhole perforated sheet or film is permanently bonded and anchored bodily by material, which penetrates within the perforations on one side, of a thermoplastic or duroplastic plate or compound made of one or more layers.
08. The light scaffolding plate according to Claims 01 through 08, characterized in that the support core between the two cover layers of the plate is made of molded thermoplastic or duroplastic material, such as honeycombs, webs, caps, corrugated profiles, foamed or other spacer shapes, with or without fiber, textile, or nonwoven material reinforcement or solid external and/or intermediate webs.
09. The light scaffolding plate according to Claims 01 through 08, characterized in that one or both cover layers, the boundary terminuses, and/or molded-on lateral parts, suspension and paneling fittings are exclusively made of multilayered thermoplastic material, prepared with highly-oriented reinforcement elements having bidirectional molecular alignment, of identical or similarly high rigidity in strength and do not contain glass fibers or other reinforcements made of non-thermoplastic material and are thus completely recyclable.
10. The light scaffolding plate according to Claims 01 through 09, characterized in that the support core between the two cover layers is made of thermoplastic base material, prepared with highly-oriented reinforcement elements having bidirectional molecular alignment, of identical or similar base material having high rigidity in strength and does not contain glass fibers or other

reinforcements made of non-thermoplastic material and is thus completely recyclable, even together with cover layers made of the same material.

11. The light scaffolding plate according to Claims 01 through 11, characterized in that the thermoplastic support core and/or the cover layers or the material penetrating the perforated sheet on one or both sides are made of Plexiglas (PMMA), thermoplastic polyester (PET/G), polyamide (PA), polycarbonate (PC), polyethylene (PE), polytetrafluoroethylene (PTFE), polypropylene (PP), polyoxymethylene (POM), polyvinyl chloride (PVC) or a mixture of these substances having identical or different melting points.
12. The light scaffolding plate according to Claims 01 through 11, characterized in that a duroplastic or duromeric support core and/or duroplastic or duromeric cover layers or the material which penetrates the perforated sheet on one or both sides is made of phenol resin, cresol resin (PF), urea resin (UF), melamine resin (MF), and polyester resin (UP) or a mixture of these substances.
13. The light scaffolding plate according to Claims 01 through 12, characterized in that, to achieve better strength and rigidity, modulus of elasticity, modulus of bending and creep, hardness, dimensional stability in the heat, tearing and tensile strength, compression resistance, dimensional stability, density, fatigue strength, thermal conductivity, melting viscosity, reduction of stretching, impact toughness, impact strength when notched, creep tendency, shrinkage, thermal expansion, abrasion resistance, UV and weather resistance, and melt flow index, additives which influence these are admixed with the thermoplastic material, such as talcum, wood flour, wollastonite, zinc oxide, metal powder, mica, calcium carbonate, or other suitable substances, or the materials themselves already have different melting points.
14. The light scaffolding plate according to Claims 01 through 13,

characterized in that it has a suspension, molded onto and/or from the support core and cover layer material, in a known claw shape to be hung in the scaffold structure, which is provided with an upright angled profile or U-profile.

15. The light scaffolding plate according to Claims 01 through 14, characterized in that it has a suspension, molded onto and/or molded through compression from the support core and cover layer material in a known claw and/or round groove shape to be hung in the scaffold structure, which is provided with an upright angled profile or U-profile or a round pipe.
16. The light scaffolding plate according to Claims 01 through 15, characterized in that it has, alone or in addition to the claw and/or round groove shape, holes to be hung in the scaffold structure, which is provided with corresponding upright pins, the holes being reinforced by hollow rivets made of metal or plastic or by material compression at the hole edges.
17. The light scaffolding plate according to Claims 01 through 16, characterized in that the molded suspension according to Claims 14 through 16 is molded uniformly onto the entire plate width or part thereof, such as a half, a third, a quarter, or less.
18. The light scaffolding plate according to Claims 01 through 17, characterized in that the molded suspension is molded onto both ends of the plate in a lattice shape for interlocking two plates.
19. The light scaffolding plate according to Claims 01 through 18, characterized in that it is inserted or attached as a component in a frame using the suspension shapes according to Claims 14 through 18.
20. The light scaffolding plate according to Claims 01 through 19, characterized in that it has no lateral protection edge and/or lateral projection part.

21. The light scaffolding plate according to Claims 01 through 20, characterized in that lateral protection parts are molded onto one or more lateral edges.
22. The light scaffolding plate according to Claims 01 through 21, characterized in that it is suitable for a falling weight test, with or without reinforcement, frameless, self-supporting, supporting a full load, and using 100, 150, 200, or 250 kg falling weight in the middle or another location between the suspensions of the plate.
23. The light scaffolding plate according to Claims 01 through 22, characterized in that it has the suspension fitting or hole and the required lateral protection part molded on and is stackable.
24. The light scaffolding plate according to Claims 01 through 23, characterized in that it has upward and downward bevels in the lateral region over the entire length or parts thereof.
25. The light scaffolding plate according to Claims 01 through 24, characterized in that the downward bevels on both sides have identical or different types and/or sizes.
26. The light scaffolding plate according to Claims 01 through 25, characterized in that the upward bevel for the lateral protection part in the lateral region is up to 10 cm high.
27. The light scaffolding plate according to Claims 01 through 25, characterized in that the upward bevel for the lateral protection part in the lateral region is up to 15 cm high.

28. The light scaffolding plate according to Claims 01 through 25, characterized in that the upward bevel for the lateral protection part in the lateral region is up to 100 cm high or is the typical height of a guardrail for falling protection.
29. The light scaffolding plate according to Claims 01 through 25, characterized in that the upward bevel for the lateral protection part in the lateral region is up to 150 cm high.
30. The light scaffolding plate according to Claims 01 through 29, characterized in that the upward bevel for the lateral protection part in the lateral region is in two or three parts and has a total height of up to 350 cm.
31. The light scaffolding plate according to Claims 01 through 30, characterized in that the lateral protection part is made of two or three independent parts.
32. The light scaffolding plate according to Claims 01 through 31, characterized in that the upward and downward bevels in the lateral region are thermoplastically compressed to other material thicknesses during the beveling and the edges are closed and/or grooves or other connection parts are molded on, which receive an extension of the lateral protection part in height through placement, insertion, or other attachment and hold it in such a way that it is removable and secured against unintentional detachment.
33. The light scaffolding plate according to Claims 01 through 32, characterized in that the second and further parts of the lateral protection part are significantly thinner than the part molded onto the plate.
34. The light scaffolding plate according to Claims 01 through 33, characterized in that the lateral protection part has large recesses or openings.

35. The light scaffolding plate according to Claims 01 through 34, characterized in that the thermoplastic material of the connection and cover layers and the support core, particularly also the lateral protection part, is colorless and transparent to light.
36. The light scaffolding plate according to Claims 01 through 35, characterized in that it has a width of 58 to 65, 88 to 95, 118 to 125, or up to 150 cm, calculated with or without the lateral upward bevel.
37. The light scaffolding plate according to Claims 01 through 36, characterized in that it has a length of up to approximately 60, 100, 150, 200, 250, 300, 350, or 400 cm.
38. The light scaffolding plate according to Claims 01 through 37, characterized in that it or possibly its lateral protection parts may be attached sufficiently securely and removably to the scaffolding using securing pins or other securing devices.
39. The light scaffolding plate according to Claims 01 through 38, characterized in that the lateral downward bevel in the region of the suspension on both ends of the plate is used as a displacement guard against the suspension.
40. The light scaffolding plate according to Claims 01 through 39, characterized in that the suspension is secured on one or both ends of the plate using a permanently elastic plastic spring or flap which only opens to pressure.
41. The light scaffolding plate according to Claims 01 through 40, characterized in that, over the entire top of the cover layer or at individual points thereof, it has a slip-proof, raised, or depressed texture.

42. The light scaffolding plate according to Claims 01 through 41, characterized in that it has a slip-proof, raised, or depressed perforated metal cover layer over the entire top or at individual points thereof.
43. The light scaffolding plate according to Claims 01 through 42, characterized in that the perforated metal sheet absorbs the static strain towards sag at the required load on the top and bottom in connection with the support core.
44. The light scaffolding plate according to Claims 01 through 43, characterized in that the perforated metal is either aluminum, also admixed with other metals, steel (hot galvanized or aluminized), stainless sheet steel, or other metals or metal composite materials and has either a simple perforation, a sinkhole, slotted bridge, projecting, lapped, or similar perforation or a depressed perforation in this or similar form.
45. The light scaffolding plate according to Claims 01 through 44, characterized in that the perforated metal is provided with an additional primer (adhesion promoter) or a color layer toward the support core and/or toward the top or bottom.
46. The light scaffolding plate according to Claims 01 through 45, characterized in that the outer cover layer is a metal plate or sheet on top or bottom or on both sides, having stabilizing beads, which are oriented to the cover layer, in the longitudinal direction of the plate.
47. The light scaffolding plate according to Claims 01 through 45, characterized in that the outer cover layer is a metal plate or sheet on top or bottom or on both sides, having stabilizing beads, which are oriented to the cover layer, in the transverse direction of the plate.
48. The light scaffolding plate according to Claims 01 through 47,

characterized in that the external perforated sheet cover layer has unperforated metal strips between the rows of holes in the perforation, particularly in the longitudinal or similar perforation, in the direction of the main load towards sag.

49. The light scaffolding plate according to Claims 01 through 48, characterized in that the perforated sheet cover layer is bonded to the plastic bonding layer by enclosing the holes, beads, hooks, or claws, etc. or solely by melting into the upper and/or lower surfaces of the support core.
50. The light scaffolding plate according to Claims 01 through 49, characterized in that in the event of sinkhole, slotted bridge, or similar perforations in the perforated sheet, which are positioned on one or both sides of the plate, preferably linearly parallel to the main sag direction upon load of the plate, and may even be offset to one another, the plastic material which penetrates the sheet at the hole locations has multiple connections, equal to the multiple holes, which are formfitting, similar to rivets or flat rivets, between the perforated sheet and support core, so that a homogeneous connection arises which is distributed over the entire plate area.
51. The light scaffolding plate according to Claims 01 through 50, characterized in that, in the sinkhole perforation, the sinking of the hole makes up approximately 70, 60, or 50% and the actual hole makes up approximately 50, 40, or 30%.
52. The light scaffolding plate according to Claims 01 through 50, characterized in that, in the slotted bridge perforation, the longer and narrow side of the slotted bridge runs parallel to the direction of the load towards sag of the plate and makes up approximately 70, 60, 50, 40, or 30% of the sheet area.
53. The light scaffolding plate according to Claims 01 through 50,

characterized in that, in the slotted bridge perforation, the hole and the slotted bridge are implemented as approximately square having rounded corners and the hole size makes up approximately 70, 60, 50, 40, or 30% of the sheet area.

54. The light scaffolding plate according to Claims 01 through 53, characterized in that the perforated sheet cover layer is provided over the entire area on one side only on top and is provided with lateral C-shaped, L-shaped, or U-shaped stiffening downward bevels, which completely or partially enclose the support core on the other side.
55. The light scaffolding plate according to Claims 01 through 53, characterized in that a plastic, preferably thermoplastic support core, which is enclosed on both sides or all sides, is permanently glued or welded into a pocket-shaped metallic cover layer.
56. The light scaffolding plate according to Claims 01 through 55, characterized in that the support core is made of thermoplastic foam having closed pores.
57. The light scaffolding plate according to Claims 01 through 55, characterized in that the support core is made of one or more honeycomb plates, with or without honeycomb tubes each closed by a cover layer.
58. The light scaffolding plate according to Claims 01 through 55, characterized in that the support core is made of continuously extruded honeycomb plates having flattened, padded tube ends.
59. The light scaffolding plate according to Claims 01 through 58, characterized in that it or the lateral projection parts which are molded or placed on has an identification or inscription, also as an advertising text, which is visible

over the entire area and/or only through the holes of the perforated sheet cover layer.

60. The light scaffolding plate according to Claims 01 through 59, characterized in that it is colored permanently, weather resistant, and UV resistant in the plastic material in one or more colors by choice and/or in the metal cover layer or is provided with a primer/adhesion promoter.
61. The light scaffolding plate according to Claims 01 through 60, characterized in that it has a small or large climb-through opening having an inserted flap made of identical material, which is connected to the plate either using typical hinges or preferably using a flexible cover and hinge layer made of permanently movable, thermoplastic material, and permanently actively closes the climb-through opening automatically or by actuating the closure after climbing through.
62. The light scaffolding plate according to Claims 01 through 61, characterized in that the frame for hanging the flap of the climb-through opening is molded directly onto the plate, contains reinforcements, and the flap is made of the same material as the plate, either in the same or much lower thickness.
63. The light scaffolding plate according to Claims 01 through 62, characterized in that the cover layer of the plate on top and bottom and the lateral protection parts comprise identical or different materials and material thicknesses.
64. The light scaffolding plate according to Claims 01 through 63, characterized in that, through a deformation of the cover layers, these become supporting webs or profiles within or at the edges of the support core or are used themselves as the support core.
65. The light scaffolding plate according to Claims 01 through 64,

characterized in that within the plate or as a lateral terminus of the plate in the longitudinal direction, one or more pipes or U-profiles made of metal or fiberglass-reinforced plastic, also enclosed or molded out of perforated sheet metal, are welded in or on or glued in or on to absorb elevated loads.

66. The light scaffolding plate according to Claims 01 through 65, characterized in that the lateral edges are provided with a round, square, or rectangular pipe, a U-profile, a special extruded or roll-formed profile having grooves for receiving the upper and lower cover sheets, which are beveled downward laterally in this case.
67. The light scaffolding plate according to Claims 01 through 66, characterized in that the scaffolding plate cover continues with identical surface in one piece without interruption up to the end of the web of the claw or round groove of the suspension fitting or the two suspension fittings.
68. The light scaffolding plate according to Claims 01 through 67, characterized in that the metallic scaffolding plate cover layer is embedded in the plastic cover layer at its edges as a protection from injuries.
69. The light scaffolding plate according to Claims 01 through 68, characterized in that the web of the claw of the suspension part is positioned perpendicularly to the scaffolding plate.
70. The light scaffolding plate according to Claims 01 through 68, characterized in that the web of the claw of the suspension part is angled outward up to 45° or has a slight angle inward.
71. The light scaffolding plate according to Claims 01 through 70,

characterized in that the opening of the claw of the suspension part, up to its throat, has a depth of 10 and at most 20 mm, of 20 and at most 30 mm, of 30 and at most 48 mm, or a larger dimension.

- 72. The light scaffolding plate according to Claims 01 through 71, characterized in that the rounded area of the suspension groove is crescent-shaped or only partially crescent-shaped.
- 73. The light scaffolding plate according to Claims 01 through 72, characterized in that the web of the claw of the suspension part simultaneously supports the holding of the plate on the rising web of the holder profile through appropriate deformation.
- 74. The light scaffolding plate according to Claims 01 through 73, characterized in that a component of the suspension part of the plate, both for the claw and for the suspension round groove, is a holding guard engaging on the holding profile or suspension pipe.
- 75. The light scaffolding plate according to Claims 01 through 74, characterized in that a perforated metal plate is embedded or welded bodily enclosed permanently in a thermoplastic layer, plate, or film made of one or more layers.
- 76. The light scaffolding plate according to Claims 01 through 75, characterized in that, in the perforated metal plate, all or only some holes of the plate have hole edge depressions.
- 77. The light scaffolding plate according to Claims 01 through 76, characterized in that the perforated metal cover layer has a constriction of the hole tapering conically inward on all or only individual hole edges.

78. The light scaffolding plate according to Claims 01 through 77, characterized in that all or individual holes of the perforated metal cover layer simultaneously have edge depressions and the material of the cover layer narrows in thickness toward the hole center on all or individual hole edges.
79. The light scaffolding plate according to Claims 01 through 78, characterized in that the edge depressions of the perforated metal cover layer have the height, more than the height, or less than the height corresponding to the material thickness thereof.
80. The light scaffolding plate according to Claims 01 through 79, characterized in that the edge of the holes in the perforated metal cover layer runs from top to bottom at an angle of 25 to 65° toward the hole center and is or is not flattened shortly before the opening of the hole.
81. The light scaffolding plate according to Claims 01 through 80, characterized in that the height of the downward bevel may exceed the plate thickness by up to multiple times.
82. The light scaffolding plate according to Claims 01 through 81, characterized in that, from the viewpoint of the plate center, a groove is molded onto the entire plate width in front of the outer downward bevel(s).
83. The light scaffolding plate according to Claims 01 through 82, characterized in that, from the viewpoint of the plate center, a semicircular or partially semicircular recess is provided in front of the outer downward bevel (s) on both sides on thinner plates and continuously on thicker plates.
84. The light scaffolding plate according to Claims 01 through 83, characterized in that it is provided in the main support direction with grooves, beads, and/or upward and downward bevels.

85. The light scaffolding plate according to Claims 01 through 84, characterized in that, within the plate area, it has small or large recesses, with or without plates or inserted covers of the same or lesser thickness, also bonded to the plate using elastic thermoplastic material.
86. The light scaffolding plate according to Claims 01 through 85, characterized in that both the thermoplastic support core in direct connection and also the cover layers as intermediate layers of the welded connection to the perforated metal are manufactured from polypropylene (PP) and the plate is therefore completely recyclable in spite of the different melting points of plastic and metal.
87. The light scaffolding plate according to Claims 01 through 86, characterized in that all or individual holes of the perforated or sinkhole perforated sheet metal plate are implemented as round or square holes, oblong holes, hexagonal or polygonal holes, diamond holes, triangular holes, star-shaped holes, keyholes having rounded corners or angled, or even as other types of holes.
88. The light scaffolding plate according to Claims 01 through 87, characterized in that it has an area weight of up to 11, 9, or 7 kg/m² at a thickness of approximately 50 to 60 mm, an area weight of up to 10, 8, or 6 kg/m² at a thickness of approximately 40 to 50 mm, an area weight of up to 7, 6, or 5 kg/m² at a thickness of approximately 20 to 30 mm, and an area weight of up to 6, 5, 4, 3.5, or 3 kg/m² at a thickness of up to 20 mm.
89. The light scaffolding plate according to Claims 01 through 88, characterized in that the plastic cover layers having glass fiber reinforcement each weigh approximately 1.0 to 1.5 kg and are approximately 1.0 to 2.0 mm thick, the perforated metal or sinkhole perforated sheet metal cover layers in an aluminum

alloy, which are bonded to plastic, each weigh approximately 0.6 kg to 1.8 kg and are 0.3 to 0.5 mm thick.

90. The light scaffolding plate according to Claims 01 through 89, characterized in that the thermoplastic support core, with or without reinforcement, weighs 0.6 to 1.0 kg/m² per centimeter of thickness.
91. The light scaffolding plate according to Claims 01 through 90, characterized in that only a metal sheet without perforations, in identical or different thicknesses, with or without an anti-slip covering, which is primed (provided with an adhesion promoter) toward the support core, is attached on the top and bottom as the cover layer.
92. The light scaffolding plate according to Claims 01 through 91, characterized in that the finished compressed plate having aluminum cover layer is chemically treated or eloxated in a selected color in the eloxal bath in the cover layers together with the visible plastic parts.
93. A light plate analogous to a scaffolding plate according to Claims 01 through 92, characterized in that it is used as a floor plate, timbering plate, wall plate, wall panel, sound protection plate, thermal or sound insulation plate, roof panel, support layer for a photovoltaic laminate or for photovoltaic cells, table or table tennis plate, bench or chair, also having molded-on and foldable legs, door, gate, or garage door, stair step, as a decorative plate and for vehicle superstructures, as well as many other products, and molded as a supporting profile.
94. A light plate analogous to a scaffolding plate according to Claims 01 through 93, characterized in that it is used as a vacuum panel if a gas-permeable support core and a gas-impermeable film which encloses it are used.

95. A method for manufacturing a light support plate according to Claims 01 through 94 in a stationary plate press,
characterized in that the plate is compressed from a thermoplastic support core, which determines the color of the outside of the plate, or other spacers in overdimensioned thickness and required width and length in the middle, over which only a sheet, a perforated sheet, or a sinkhole perforated sheet is laid on the top and bottom, in a single hot press and cold press pass having temperatures for heating and cooling tailored to the different melting points of the materials and the material thicknesses in direct contact with the hot and subsequently cold plates of the press and/or the possibly required, also textured separating film(s) and is thermoplastically bonded to the panel, whose later thickness and color design are previously determined, and receives the final, depressed or raised surface structure and shape and, if corresponding molding tools are used, additional molded-on parts such as claws, grooves, and other suspension fittings, closures, reinforcement, inserts and web inclusions, edges, and holes.
96. A method for manufacturing a light scaffolding plate according to Claims 01 through 94 in a stationary plate press,
characterized in that the plate is compressed from a thermoplastic support core, which determines the color of the outside of the plate, or other spacers in required thickness, width, and length in the middle and thermoplastic cover layers on the top and bottom, over which a perforated sheet or a sinkhole perforated sheet is laid or which are reinforced using fibers, textiles, or nonwoven materials, in a single hot press and cold press pass having temperatures for heating and cooling tailored to the different melting points of the materials and the material thicknesses in direct contact with the hot and subsequently cold plates of the press and/or the possibly required, also textured separating film(s) and is thermoplastically bonded to the panel, whose later thickness and color design are previously determined, and receives the final, depressed or raised surface structure and shape and, if corresponding molding tools are used, additional

molded-on parts such as claws, grooves, and other suspension fittings, closures, reinforcement, inserts and web inclusions, edges, and holes.

97. The method for manufacturing a light scaffolding plate according to Claims 95 and 96,
characterized in that the plates are pressed in a single pressing pass laid next to or one behind another in multiple units.
98. The method for manufacturing a light scaffolding plate according to Claims 95 through 97,
characterized in that if a sinkhole perforated metal plate is used, the liquid thermoplastic compound arising from the thermoplastic cover layer and/or the surface of the support core during the hot pressing flows through the holes, fills up the depressions in the plate, and, during the subsequent cooling, forms the solid rivets required for the bodily formfitting bond or the clawing.
99. The method for manufacturing a light scaffolding plate according to Claims 95 through 97,
characterized in that if a perforated metal plate is used, the liquid thermoplastic compound arising from the thermoplastic cover layer and/or the surface of the support core during the hot pressing flows through the holes and expands over the holes into a flat plastic layer and, during the subsequent cooling, forms the connection pins to the flat plastic layer required for a bodily formfitting bond or the clawing.
100. The method for manufacturing a light scaffolding plate according to Claims 95 through 97,
characterized in that the stability, the modulus of elasticity, and the UV and weather resistance of the plate, in addition to the strength and the material properties of the cover layer, are influenced by enlarging or reducing the holes

size and/or sinking the holes and/or through offset arrangement of the holes in the direction of the strain.

101. A method for manufacturing a light scaffolding plate according to Claims 01 through 100,
characterized in that it is performed in a continuously running extruding procedure with the honeycomb support core, with or without flattened plate surface, or a continuously running deep drawing procedure for a support core in a tubular, cap, box, web, corrugated, or similar structure, the introduction of slots in the honeycomb structure, with subsequent hot pressing of the cover layers of identical or different thickness from the coil or as a plate in the continuous or plate press clocked method, with or without intermediate layers of nonwoven material, textile, or adhesive layers, with or without the application of depressed or raised structures or surface coatings such as a slide protection structure or perforated metal or sinkhole perforated metal or similar layers, notching slots, holes, or similar things, the subsequent edging and fitting molding and the trimming or cutting while maintaining or introducing the required, exactly controlled melting temperature at the surfaces to be melted and material underneath to be melted and subsequent cooling in the subsequent cold press, each under electronic or manual control and precise consideration of the temperature window required for the material.